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# Smart Bus System

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## ABSTRACT

In this paper we present bus a system which kept stationary at the bus-stand and system which kept at bus that can effectively help the public to participate in bus transportation facilities to its fullest. A bus that is coming toward the bus –stand is identified by this passenger infotainment system and the details of that particular bus is provided to the passenger on display at bus-stand. Bus location identified using GPS & same will be announce in Bus This information send to next bus stand for passengers. The bus identification process involves usage of Radio Frequency technology and bus details are announced by Voice and displayed in Liquid Crystal Display (LCD) unit. The summary of current research provides details about the integration between Microcontroller and RF transceiver, GSM and GPS LCD display, Voice Announcement.

**Keywords:** GPS, GSM, Passenger Information System, RF technology, Voice Announcement.

## I. INTRODUCTION

Wireless communication can be defined as transfer of information between two or more points without using wires or cables. There are different wireless technologies such as RFID, IR, GPS, Bluetooth, and WI-FI, etc. In olden days location announcement was done with the help of speakers, but now it is developed by using IVRS in railways stations. Nowadays bus location can be found with the help of Geo Positioning satellites.

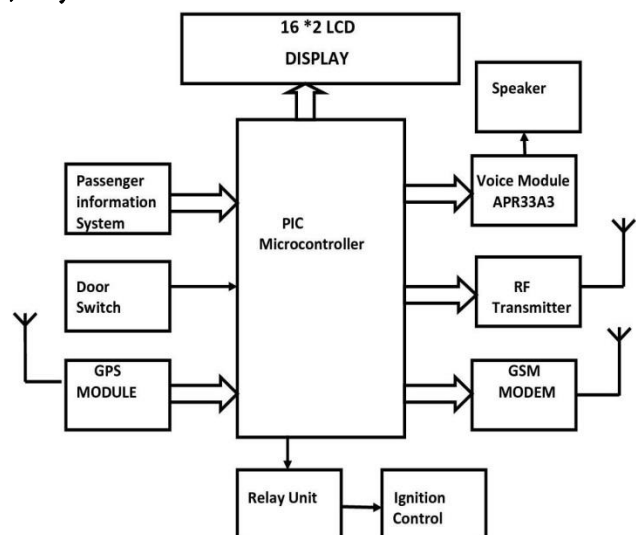
This bus location announcement system is very helpful for people who are blind, illiterates and new to cities. This system can be applied in different areas like transport companies, public trains, private travels, government travel agencies, service organizations, etc.

With the advent of GPS and the ubiquitous cellular network, real time vehicle tracking for better transport management has become possible. These technologies can be applied to public transport systems, especially buses, which are not able to adhere to predefined timetables due to reasons like

traffic jams, breakdowns etc. The increased waiting time and the uncertainty in bus arrival make public transport system unattractive for passengers. A Real-Time Passenger Information System uses a variety of technologies to track the locations of buses in real time and uses this information to generate predictions of bus arrivals at stops along the route.

## II. BLOCK DIAGRAM

### a) System in Bus

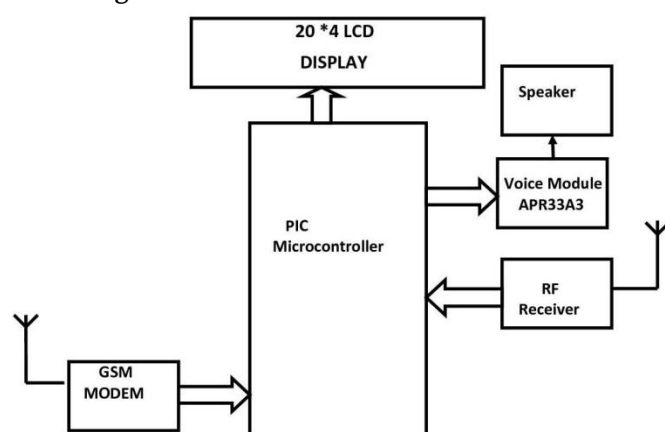


**Figure 1.** System in Bus (Transmitter).

The transmitter module comprises of the power supply, RF transmitter, microcontroller, GPS module, GSM modem, Voice module APR33A3, LCD display, door switch and ignition control relay and driver. The transmitter system is powered by the bus battery. The main considerations of the transmitter design depend on characteristics of RF Transmitter. It includes UART rate, frequency, air rate and RF Power. Based on the requirements, modulation technique and operating frequencies are allotted for the transmitter.

#### b) System at Bus Stand

The Receiver module consists of the power supply, RF Receiver, microcontroller, GSM modem, voice module APR33A3 and the LCD display [1]. The RF receiver is connected to the microcontroller. The LCD display and Voice Announcement System are also integrated to the microcontroller.



**Figure 2.** System at Bus stand (Receiver)

The LCD displays the bus details by retrieving information stored in the microcontroller. The Voice Announcement System which is integrated to the receiver module is a single chip IC. This IC helps to record/playback the messages through voice. This chip with the power management system can be used efficiently for voice announcement.

Following are the main blocks of project:

#### a) GPS

A GPS tracking device is a reliable way to observe an object in motion. It makes available the necessary

details such as location and time information irrespective of the weather conditions, anywhere on or near the earth. The Passenger Information Systems exist in various cities that use GPS (Global Positioning System) systems for bus tracking [4]. This technology demands line-of-sight between the receiver and the satellites. Ignoring this condition makes the GPS signal to attenuate. This limitation makes GPS unsuitable for bus tracking systems inside a sub terrestrial bus station. These two major drawbacks can be overcome by the proposed system as it involves RF transceiver that has a communication range upto 1000m and demands neither line-of-sight communication nor satellite communication.

#### b) RF technology

The Radio Frequency Technology is a wireless non-contact system that uses radio frequency range (3kHz to 300Ghz) of electromagnetic fields to transfer data from a transmitter to a receiver for the purposes of automatic identification and tracking in many applications. The module itself is better known as transceiver as, unlike the RFID, it contains an integrated high speed microcontroller unit and high capability RF IC. The main advantages include anti interference, high sensitivity and large buffer zone for data transmission providing more channels. Working of the transceiver module requires a power supply such as batteries.



**Figure 3.** RF module

This idea aims to achieve bus identification at a distance of at least 600m from the bus-stand. The characteristics of RF transceiver module well-suits the requirements and highly cost effective compared to other wireless systems such as GPS.

### c) *Voice Announcement System*

In this paper, the emphasis, regarding the output mechanism, is given to Voice announcement system. It is similar to the announcement systems in railways. The reason for emphasizing is that it helps the illiterate people and the visually challenged people efficiently. This system involves a single chip capable of high quality audio recording and playback solution and a high quality speaker. This is integrated to the microcontroller of the receiver at the bus-stand. Another mode of display of bus details is through LCD display unit.



the target. We feel that lot of modifications must be carried over to design a sophisticated engineering module. We will handle this as our future work or scope of project work. Several directions for future work are immediately obvious. In particular, before conducting another round of user studies, we plan to implement all suggestions given by research participants in this project work. In addition, we would like to implement some of the features originally planned in the conceptual design of the project work. In particular, we would like to implement GPS based navigation system for the blind such that wherever they go within the specific permitted area, that particular area name must be announced, this our final target. As the technology advances, particularly in the field of world-wide communication networks Global Positioning Systems are playing dominant roll. In most applications, these devices are used as vehicle tracking systems falls in the field of ground navigating systems. But in addition to these applications, variety of services can be provided to the blind people. In this regard here this system - will be modified as our future work which is aimed to serve the blind persons by announcing the area name wherever they go with in a pre-defined area.

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